

Assignment Sheet / Density Test

Project Number : 23502-ZS9 Lab. Tech : K. Ford Project Name : HSR Date Completed : 11/4/13 Date Drilled : 10/10/13 Boring : S0070R

Sample	Depth	Tests	Soil Wt	Length	Diameter	Wet Wt	Dry Wt	Wet	Moisture	Dry	Soil
			Gms	in	in	Gms	Gms	Density	%	Density	Classification
		PI,PH,MR,CURVE,									
B01	0-5.0	RV,RVT,CHEM									ML
MC02-1	6-6.5	TRX									CL
SS03	11-11.5	HY,SA				30	24.9		20.5%		ML
U05	20.5-21	DS	137.8	1.02	2.42	266	235.5	111.9	12.7%	99.3	SW
	21-21.5										
SS06	26-26.5	SA				200	171.1		16.9%		SM
MC07-1	31-31.5	DS	150.9	1.02	2.42	135	120.4	122.6	11.9%	109.6	SP
SS08	36-36.5	HY,SA				30	26.7		12.4%		SP
MC09-1	41-41.5	DS	153.9	1.02	2.42	154	125.5	125.0	22.6%	101.9	SM
SS10	46-46.5	PI									ML/CL
MC11-1	51-51.5	DS	152.6	1.02	2.42	153	128.6	123.9	18.7%	104.4	SP
SS12	56-56.5	PI									ML
MC13-1	61-61.5	TRX									CL
MC15-2	70.5-71	SA				300	239.3		25.4%		SM
SS16	76-76.5	HY,SA				30	25.3		18.6%		CL
MC17-1	81-81.5	TRX									CL
SS21	96-96.5	PI									ML

Notes:

CHEM Sulfate/Chloride MR Minimum Resistivity
COLL Collapse PH pH Test

COLL Collapse PH pH Test
CONSOL 1D Consolidation PI Atterberg Limits

CURV Modified Proctor RV R-value

DD Moisture Density RVT R-value Treated
DS Direct Shear SA Sieve Analysis
HY Hydrometer TRX Triaxial Compression



Assignment Sheet / Density Test

Project Number : 23502-ZS9 Lab. Tech : K. Ford Project Name : HSR Date Completed : 1/20/14

Date Drilled : 1/8/14

Boring	Sample	Depth	Tests	Soil Wt	Length	Diameter	Wet Wt	Dry Wt	Wet	Moisture	Dry	Soil
				Gms	in	in	Gms	Gms	Density	%	Density	Classification
0019AR	MC03-2	15.5-16'	SA				200	174.1		14.9%		SP
S0019AR	SS06	30-31.5'	SA				200	181.5		10.2%		SM/SP
S0020R	SS07	25-26.5'	SA				200	167.7		19.3%		SM
S0021R	MC10-1	46-46.5'	SA				200	180.2		11.0%		SM/ML
S0021R	MC18-1	86-86.5'	SA				200	184.8		8.2%		SP
S0021R	SS07	30-31.5'	SA				200	171.3		16.8%		SM/SP
S0029R	MC08-1	30.9-31.4'	SA				200	174.1		14.9%		SM
S0031R	MC03-2	10.4-11	SA				200	166.5		20.1%		SP
S0031R	SS08	35-36.5'	SA				200	175.4		14.0%		SM
S0034BR	MC09-1	41-41.5'	HY,SA									SM/ML
S0065R	MC04-2	15.5-16'	SA				200	172.6		15.9%		SM/SP
S0066R	MC03-2	10-11.5'	SA				200	172.0		16.3%		SM
S0067R	MC06-1	25-26.5'	SA				200	169.4		18.1%		SP
S0067R	MC11-1	45-46.5'	HY,SA									SM
S0067R	MC23-1	95-96.4'	HY,SA									SM
S0070R	MC09-2	40.5-41'	HY,SA									SM
S0070R	U05	20-22'	HY,SA									SM
S0072R	MC12-1	51-51.5'	HY,SA									SM
S0073R	MC11-2	45.5-16'	HY,SA									ML/CL
			,									
											1	

Notes:

CHEM Sulfate/Chloride MR Minimum Resistivity Collapse РΗ COLL pH Test CONSOL 1D Consolidation Ы Atterberg Limits CURV Modified Proctor RV R-value DD Moisture Density RVT R-value Treated DS Direct Shear SA Sieve Analysis HY Hydrometer TRX Triaxial Compression



Construction Testing & Inspection * Geotechnical & Environmental Engineering

Sieve Analysis for Soil and Fine Aggregate

 Project:
 CA HSR FRE_BAK
 Technician:
 K. Ford

 Date:
 10/22/2013

 TES#:
 23502-ZS9
 Sample No.:
 SS03

 Boring No.:
 S0070R
 Remarks:
 (ML) Sandy Clayey Silt

	Weight	Maximum	Minimum Weight of
	(grams)	Sieve Size	Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	74.0	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Soil Before Wash	74.0	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Soil After Wash	29.7	2"	44.0 (20.0)

	Individual	Individual	Combined	Combined	
Sieve	Weight	%	%	%	
Size	Retained	Retained	Retained	Passing	Specs.
3 in.	0.0	0.0	0.0	100.0	
2 1/2 in.	0.0	0.0	0.0	100.0	
2 in.	0.0	0.0	0.0	100.0	
1 1/2 in.	0.0	0.0	0.0	100.0	
1 in.	0.0	0.0	0.0	100.0	
3/4 in.	0.0	0.0	0.0	100.0	
1/2 in.	0.0	0.0	0.0	100.0	
3/8 in.	0.0	0.0	0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.6	0.8	0.8	99.2	
#10	0.2	0.3	1.1	98.9	
#16	0.2	0.3	1.4	95.7	
#30	5.4	7.3	8.6	91.4	
#40	1.8	2.4	11.1	89.0	
#50	2.4	3.2	14.3	85.8	
#100	6.2	8.4	22.7	77.5	
#200	11.7	15.8	38.5	61.9	_
Pan					



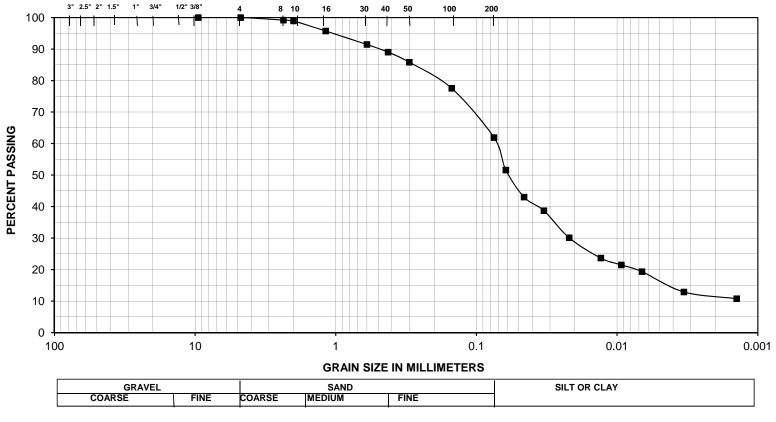
HYDROMETER TEST DATA SUMMARY ASTM D 422-63

PROJECT:		CA HSR F	RE_BAK			TES # : 23502-ZS9			
Boring Number		S007	70R	_		DATE:	10/22/2013		
Sample Depth	, ft	26.0'-	26.5'	Sample No.:	SS03	TESTED BY:	K. Ford		
Mass of Test S	Sample d		75.00	"air-dried"	٦	Hydrometer Type	151H		
	scopic Sample, g	17.91		"air-dried"		Trydromotor Typo	10111		
	scopic Sample, g		17.67	"oven-dried"	Specific Gravity	of Test Material	2.650		
Mass of Test			73.99	"oven-dried"	Specific Gravity		Varies		
Time	Hydrometer	Corrected	Temperature	Effective Depth	Constant, K	Diameter, D	Amt. Suspended, P		
(min.)	Reading	Reading	Degrees C	Table 2 (cm)	Table 3	(mm)	(%)		
0.5	1.026	1.024	19	10.0	0.01382	0.0618	52.2		
1	1.022	1.020	19	11.0	0.01382	0.0458	43.5		
2	1.020	1.018	19	11.5	0.01382	0.0331	39.1		
5	1.016	1.014	19	12.6	0.01382	0.0219	30.4		
15	1.013	1.011	19	13.4	0.01382	0.0131	23.9		
30	1.012	1.010	19	13.7	0.01382	0.0093	21.7		
60	1.011	1.009	19	13.9	0.01382	0.0067	19.6		
250	1.008	1.006	19	14.7	0.01382	0.0034	13.0		
1440	1.007	1.005	19	15.0	0.01382	0.0014	10.9		
4140	1.006	1.004	19	15.2	0.01382	0.0008	8.7		



U.S. STANDARD SIEVE OPENING IN INCHES

U.S. STANDARD SIEVE NUMBERS



—■— SS03	
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Sample #	Classification	% Gravel	% Sand	% Silt	% Clay*	% Moist.	LL	PL	ΡI	Project:	CA HSR FRE_BAK
SS03	(ML) Sandy Clayey Silt	0	38.5	39.0	22.5						
										TES#:	23502-ZS9
										Boring#:	S0070R
										Date:	10/22/2013

^{*} Particles smaller than 5 Micron in diameter



Construction Testing & Inspection * Geotechnical & Environmental Engineering

Sieve Analysis for Soil and Fine Aggregate

 Project:
 CA HSR FRE_BAK
 Technician:
 K. Ford

 TES#:
 23502-ZS9
 Date:
 1/14/2014

 Boring No.:
 S0070R
 Depth, ft
 20-22'

 Sample No.:
 U05
 Classification:
 (SM) Silty Sand

	Weight (grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.	(9.5)	Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	74.1	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Soil Before Wash	74.1	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Soil After Wash	52.5	2"	44.0 (20.0)

	Individual	Individual	Combined	Combined	
Sieve	Weight	%	%	%	
Size	Retained	Retained	Retained	Passing	Specs.
3 in.	0.0	0.0	0.0	100.0	
2 1/2 in.	0.0	0.0	0.0	100.0	
2 in.	0.0	0.0	0.0	100.0	
1 1/2 in.	0.0	0.0	0.0	100.0	
1 in.	0.0	0.0	0.0	100.0	
3/4 in.	0.0	0.0	0.0	100.0	
1/2 in.	0.0	0.0	0.0	100.0	
3/8 in.	0.0	0.0	0.0	100.0	
#4	0.3	0.4	0.4	99.6	
#8	1.1	1.5	1.9	98.1	
#10	0.9	1.2	3.1	96.9	
#16	0.2	0.3	3.4	88.5	
#30	15.2	20.5	23.9	76.7	
#40	5.8	7.8	31.7	69.2	
#50	8.1	10.9	42.7	58.6	
#100	11.2	15.1	57.8	43.9	
#200	10.0	13.5	71.3	30.8	
Pan					



HYDROMETER TEST DATA SUMMARY ASTM D 422-63

PROJECT:		CA HSR F	RE_BAK		TES # :	S0070R	
Boring Number		S007	70R	_		DATE:	1/14/2014
Sample Depth	, ft	20-	22'	Sample No.:	U05	TESTED BY:	K. Ford
Mass of Test	Sample, q		75.00	"air-dried"	7	Hydrometer Type	151H
	scopic Sample, g		30.00	"air-dried"	1 "		
	scopic Sample, g		29.62	"oven-dried"	Specific Gravity of	of Test Material	2.650
Mass of Test S			74.05	"oven-dried"	Specific Gravity		Varies
Time	Hydrometer	Corrected	Temperature	Effective Depth	Constant, K	Diameter, D	Amt. Suspended, P
(min.)	Reading	Reading	Degrees C	Table 2 (cm)	Table 3	(mm)	(%)
0.5	1.016	1.014	21	12.6	0.01348	0.0677	30.4
1	1.015	1.013	21	12.9	0.01348	0.0484	28.2
2	1.014	1.012	21	13.1	0.01348	0.0345	26.1
5	1.013	1.011	21	13.4	0.01348	0.0221	23.9
15	1.012	1.010	21	13.7	0.01348	0.0129	21.7
30	1.011	1.009	21	13.9	0.01348	0.0092	19.5
60	1.010	1.008	21	14.2	0.01348	0.0066	17.4
250	1.009	1.007	21	14.4	0.01348	0.0032	15.2
1440	1.008	1.006	21	14.7	0.01348	0.0014	13.0
2880	1.007	1.005	21	15.0	0.01348	0.0010	10.9
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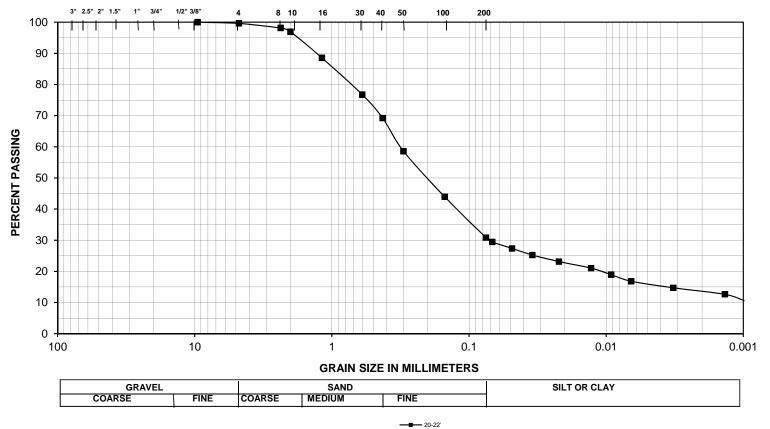


1/14/2014

Date:

U.S. STANDARD SIEVE OPENING IN INCHES

U.S. STANDARD SIEVE NUMBERS



Sample #	Classification	% Gravel	% Sand	% Silt	% Clay*	% Moist.	LL	PL	PI	Project:	CA HSR FRE_BAK
U05	(SM) Silty Sand	0.4	71.3	11.9	16.4	1.3					
										TES#:	23502-ZS9
										Boring#:	S0070R

^{*} Particles smaller than 5 Micron in diameter



Construction Testing & Inspection * Geotechnical & Environmental Engineering

Sieve Analysis for Soil / Fine Aggregate ASTM C-136

 Project:
 CA HSR
 Technician:
 K. Ford

 Date:
 10/18/2013

 TES#:
 23502-ZS9
 Sample No.:
 SS06

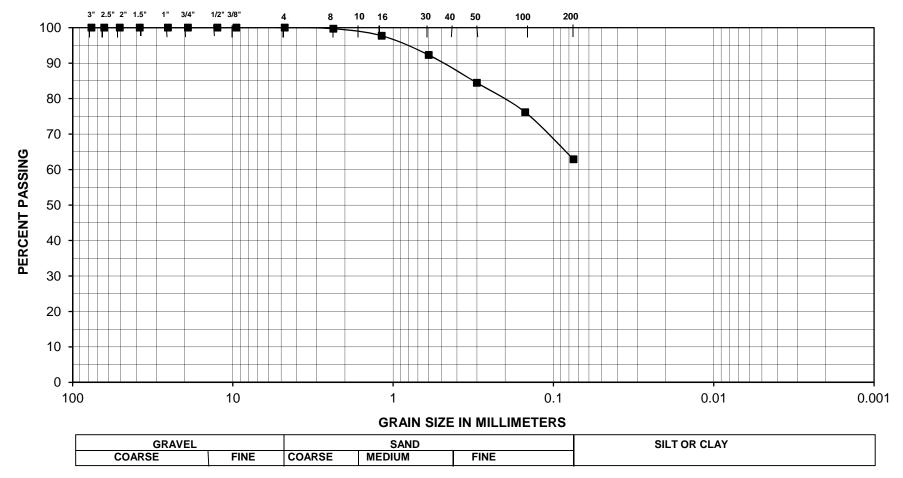
 Boring #:
 S0070R; 26-26.5'
 Classification:
 (ML) Sandy Silt

	Weight	Maximum	Minimum Weight of
	(lbs. or grams)	Sieve Size	Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	171.1	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	171.1	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	67	2"	44.0 (20.0)

	Cumulative	Individual	Cumulative	Cumulative	
. .					
Sieve	Weight	Weights	%	%	
Size	Retained	Retained	Retained	Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.5	0.5	0.3	99.7	
#16	3.9	3.4	2.3	97.7	
#30	13.2	9.3	7.7	92.3	
#50	26.6	13.4	15.5	84.5	
#100	40.8	14.2	23.8	76.2	
#200	63.5	22.7	37.1	62.9	
Pan	67				

U.S. STANDARD SIEVE OPENING IN INCHES

U.S. STANDARD SIEVE NUMBERS



 ■ SS06

Sample #	Classification	% Gravel	% Sand	% Silt	% Clay	% Moist.	LL	PL	PI	Project:	CA HSR
SS06	(ML) Sandy Silt	0	37.1	62.9							
										TES#:	23502-ZS9
										Boring #	S0070R; 26-26.5'
										Date:	10/18/2013



Construction Testing & Inspection * Geotechnical & Environmental Engineering

Sieve Analysis for Soil and Fine Aggregate

 Project:
 CA HSR FRE_BAK
 Technician:
 K. Ford

 Date:
 10/22/2013

 TES#:
 23502-ZS9
 Sample No.:
 SS08

 Boring No.:
 S0070R
 Remarks:
 (SM) Silty Sand

	Weight (grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.	,	Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	98.6	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Soil Before Wash	98.6	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Soil After Wash	60.4	2"	44.0 (20.0)

	Individual	Individual	Combined	Combined	
Sieve	Weight	%	%	%	
Size	Retained	Retained	Retained	Passing	Specs.
3 in.	0.0	0.0	0.0	100.0	
2 1/2 in.	0.0	0.0	0.0	100.0	
2 in.	0.0	0.0	0.0	100.0	
1 1/2 in.	0.0	0.0	0.0	100.0	
1 in.	0.0	0.0	0.0	100.0	
3/4 in.	0.0	0.0	0.0	100.0	
1/2 in.	0.0	0.0	0.0	100.0	
3/8 in.	0.0	0.0	0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.4	0.4	0.4	99.6	
#10	0.3	0.3	0.7	99.3	
#16	0.2	0.2	0.9	95.4	
#30	15.3	15.5	16.4	83.7	
#40	7.5	7.6	24.0	76.1	
#50	8.4	8.5	32.5	67.7	
#100	13.4	13.6	46.1	54.2	
#200	13.9	14.1	60.2	40.2	
Pan					



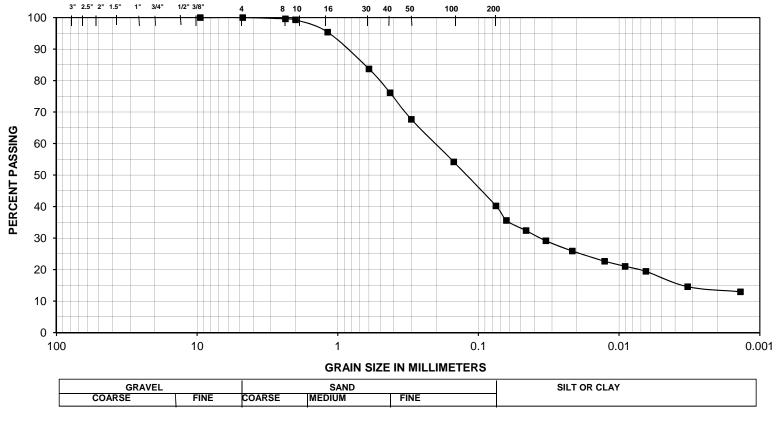
HYDROMETER TEST DATA SUMMARY ASTM D 422-63

PROJECT:		CA HSR F	RE_BAK			TES # :	23502-ZS9
Boring Number		S007	70R	_		DATE:	10/22/2013
Sample Depth	, ft	26.0'-	26.5'	Sample No.:	SS08	TESTED BY:	K. Ford
Mass of Test S	Sample d		100.00	"air-dried"	٦	Hydrometer Type	151H
	scopic Sample, g		12.45	"air-dried"	1	Trydromotor Typo	10111
	scopic Sample, g		12.28	"oven-dried"	Specific Gravity	of Test Material	2.650
Mass of Test			98.63	"oven-dried"	Specific Gravity		Varies
_							
Time	Hydrometer	Corrected	Temperature	Effective Depth	Constant, K	Diameter, D	Amt. Suspended, P
(min.)	Reading	Reading	Degrees C	Table 2 (cm)	Table 3	(mm)	(%)
0.5	1.024	1.022	19	10.5	0.01382	0.0633	35.9
1	1.022	1.020	19	11.0	0.01382	0.0458	32.6
2	1.020	1.018	19	11.5	0.01382	0.0331	29.3
5	1.018	1.016	19	12.1	0.01382	0.0215	26.1
15	1.016	1.014	19	12.6	0.01382	0.0127	22.8
30	1.015	1.013	19	12.9	0.01382	0.0091	21.2
60	1.014	1.012	19	13.1	0.01382	0.0065	19.6
250	1.011	1.009	19	13.9	0.01382	0.0033	14.7
1440	1.010	1.008	19	14.2	0.01382	0.0014	13.0
4140	1.009	1.007	19	14.4	0.01382	0.0008	11.4
			1	1	1		



U.S. STANDARD SIEVE OPENING IN INCHES

U.S. STANDARD SIEVE NUMBERS



—■— SS08

,	Sample #	Classification	% Gravel	% Sand	% Silt	% Clay*	% Moist.	LL	PL	PI	Project:	CA HSR FRE_BAK
	SS08	(SM) Silty Sand	0	60.2	18.8	21.0						
											TES#:	23502-ZS9
											Boring#:	S0070R
											Date:	10/22/2013

^{*} Particles smaller than 5 Micron in diameter



Construction Testing & Inspection * Geotechnical & Environmental Engineering

Sieve Analysis for Soil and Fine Aggregate

 Project:
 CA HSR FRE_BAK
 Technician:
 K. Ford

 TES#:
 23502-ZS9
 Date:
 1/14/2014

 Boring No.:
 S0070R
 Depth, ft
 40.5-41'

 Sample No.:
 MC09-2
 Classification:
 (SM) Silty Sand

	Weight (grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.	(9:0:::0)	Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	74.1	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Soil Before Wash	74.1	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Soil After Wash	47.3	2"	44.0 (20.0)

	Individual	Individual	Combined	Combined	
Sieve	Weight	%	%	%	
Size	Retained	Retained	Retained	Passing	Specs.
3 in.	0.0	0.0	0.0	100.0	
2 1/2 in.	0.0	0.0	0.0	100.0	
2 in.	0.0	0.0	0.0	100.0	
1 1/2 in.	0.0	0.0	0.0	100.0	
1 in.	0.0	0.0	0.0	100.0	
3/4 in.	0.0	0.0	0.0	100.0	
1/2 in.	0.0	0.0	0.0	100.0	
3/8 in.	0.0	0.0	0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.6	0.8	0.8	99.2	
#10	0.5	0.7	1.5	98.5	
#16	0.2	0.3	1.8	93.5	
#30	10.8	14.6	16.3	83.9	
#40	5.2	7.0	23.4	77.0	
#50	7.0	9.5	32.8	67.6	
#100	10.3	13.9	46.7	53.9	
#200	10.9	14.7	61.4	39.4	
Pan					



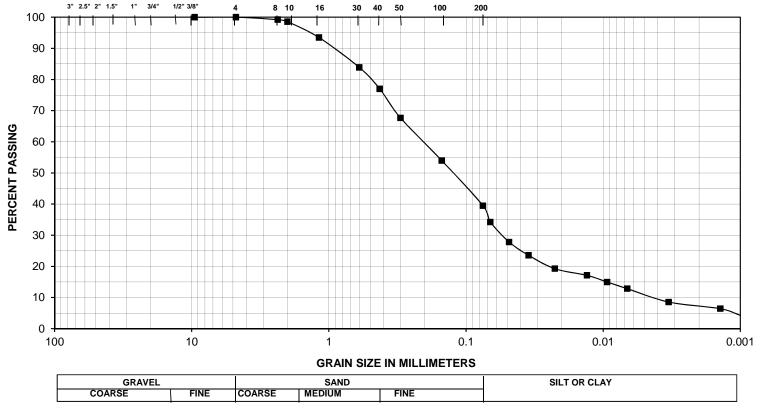
HYDROMETER TEST DATA SUMMARY ASTM D 422-63

PROJECT:		CA HSR F	RE_BAK		TES #: S0070R			
Boring Number		S007	70R	_		DATE:	1/14/2014	
Sample Depth	, ft	40.5	-41'	Sample No.:	MC09-2	TESTED BY: K. Ford		
Mass of Test S	Sample d		75.00	"air-dried"	ר	Hydrometer Type _	151H	
	scopic Sample, g		30.00	"air-dried"	1	riyarometer rype_	10111	
	scopic Sample, g		29.62	"oven-dried"	Specific Gravity	of Test Material	2.650	
Mass of Test			74.05	"oven-dried"	Specific Gravity		Varies	
Time	Hydrometer	Corrected	Temperature	Effective Depth	Constant, K	Diameter, D	Amt. Suspended, P	
(min.)	Reading	Reading	Degrees C	Table 2 (cm)	Table 3	(mm)	(%)	
0.5	1.018	1.016	21	12.1	0.01348	0.0663	34.7	
1	1.015	1.013	21	12.9	0.01348	0.0484	28.2	
2	1.013	1.011	21	13.4	0.01348	0.0349	23.9	
5	1.011	1.009	21	13.9	0.01348	0.0225	19.5	
15	1.010	1.008	21	14.2	0.01348	0.0131	17.4	
30	1.009	1.007	21	14.4	0.01348	0.0093	15.2	
60	1.008	1.006	21	14.7	0.01348	0.0067	13.0	
250	1.006	1.004	21	15.2	0.01348	0.0033	8.7	
1440	1.005	1.003	21	15.5	0.01348	0.0014	6.5	
2880	1.004	1.002	21	15.8	0.01348	0.0010	4.3	



U.S. STANDARD SIEVE OPENING IN INCHES

U.S. STANDARD SIEVE NUMBERS



 40.5-4

Sample #	Classification	% Gravel	% Sand	% Silt	% Clay*	% Moist.	LL	PL	ΡI	Project:	CA HSR FRE_BAK
MC09-2	(SM) Silty Sand	0	61.4	27.5	11.0	1.3					
										TES#:	23502-ZS9
										Boring#:	S0070R
										Date:	1/14/2014

^{*} Particles smaller than 5 Micron in diameter



Construction Testing & Inspection * Geotechnical & Environmental Engineering

Sieve Analysis for Soil / Fine Aggregate ASTM C-136

 Project:
 CA HSR
 Technician:
 K. Ford

 Date:
 10/18/2013

 TES#:
 23502-ZS9
 Sample No.:
 MC15-2

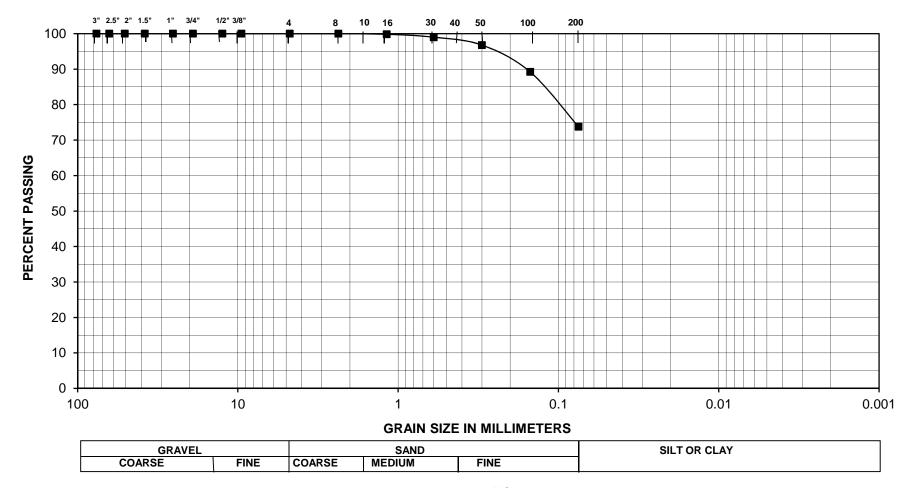
 Boring #:
 S0070R; 70.5-71'
 Classification:
 (SM) Sandy Silt

	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.	(ibs. or grains)	Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	239.3	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	239.3	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	71.9	2"	44.0 (20.0)

	Cumulative	Individual	Cumulative	Cumulative	
Sieve	Weight	Weights	%	%	
Size	Retained	Retained	Retained	Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.0	0.0	0.0	100.0	
#16	0.4	0.4	0.2	99.8	
#30	2.4	2.0	1.0	99.0	
#50	7.7	5.3	3.2	96.8	
#100	25.8	18.1	10.8	89.2	
#200	62.8	37.0	26.2	73.8	
Pan	71.9				

U.S. STANDARD SIEVE OPENING IN INCHES

U.S. STANDARD SIEVE NUMBERS



—**■**— MC15-2

Sample #	Classification	% Gravel	% Sand	% Silt	% Clay	% Moist.	LL	PL	PI	Project:	CA HSR
MC15-2	(SM) Sandy Silt	0	26.2	73.8							
										TES#:	23502-ZS9
										Boring #	S0070R; 70.5-71'
										Date:	10/18/2013



Construction Testing & Inspection * Geotechnical & Environmental Engineering

Sieve Analysis for Soil and Fine Aggregate

TES#: Boring No.	23502-ZS9	Sample No.: Remarks:	SS16 (CL) Sandy Silty Clay
		Date:	10/22/2013
Project:	CA HSR FRE_BAK	Technician:	K. Ford

	Weight (grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	73.4	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Soil Before Wash	73.4	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Soil After Wash	20.2	2"	44.0 (20.0)

	Individual	Individual	Combined	Combined	
Sieve	Weight	%	%	%	
Size	Retained	Retained	Retained	Passing	Specs.
3 in.	0.0	0.0	0.0	100.0	
2 1/2 in.	0.0	0.0	0.0	100.0	
2 in.	0.0	0.0	0.0	100.0	
1 1/2 in.	0.0	0.0	0.0	100.0	
1 in.	0.0	0.0	0.0	100.0	
3/4 in.	0.0	0.0	0.0	100.0	
1/2 in.	0.0	0.0	0.0	100.0	
3/8 in.	0.0	0.0	0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.0	0.0	0.0	100.0	
#10	0.2	0.3	0.3	99.7	
#16	0.2	0.3	0.5	98.9	
#30	1.8	2.5	3.0	97.0	
#40	1.3	1.8	4.8	95.2	
#50	1.9	2.6	7.4	92.7	
#100	5.7	7.8	15.1	84.9	
#200	8.6	11.7	26.8	73.2	
Pan					



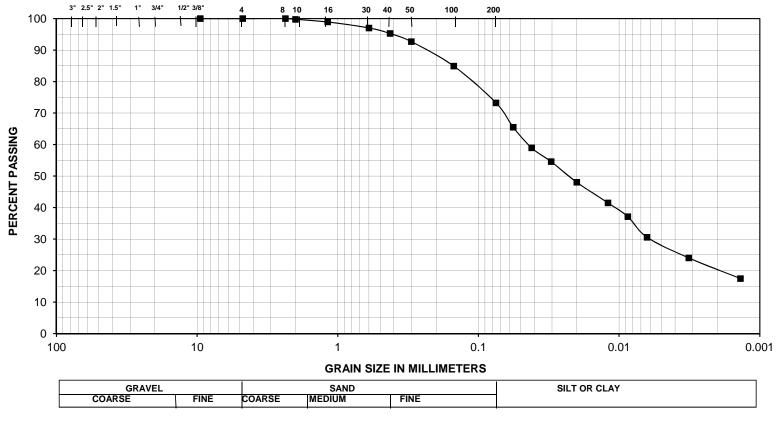
HYDROMETER TEST DATA SUMMARY ASTM D 422-63

PROJECT:		CA HSR F	RE_BAK			TES#:	23502-ZS9	
Boring Number		S007	70R	_		DATE: 10/22/2013		
Sample Depth	, ft	26.0'-:	26.5'	Sample No.:	SS16	TESTED BY:	K. Ford	
					-			
Mass of Test S			75.00	"air-dried"		Hydrometer Type	151H	
Mass of Hygro	scopic Sample, g		11.45	"air-dried"				
Mass of Hygro	scopic Sample, g		11.21	"oven-dried"	Specific Gravity of	of Test Material	2.650	
Mass of Test S	Sample, g		73.43	"oven-dried"	Specific Gravity of	of Test Solution	Varies	
Time	Hydrometer	Corrected	Temperature	Effective Depth	Constant, K	Diameter, D	Amt. Suspended, P	
(min.)	Reading	Reading	Degrees C	Table 2 (cm)	Table 3	(mm)	(%)	
0.5	1.032	1.030	19	8.4	0.01382	0.0566	65.7	
1	1.029	1.027	19	9.2	0.01382	0.0419	59.1	
2	1.027	1.025	19	9.7	0.01382	0.0304	54.7	
5	1.024	1.022	19	10.5	0.01382	0.0200	48.2	
15	1.021	1.019	19	11.3	0.01382	0.0120	41.6	
30	1.019	1.017	19	11.8	0.01382	0.0087	37.2	
60	1.016	1.014	19	12.6	0.01382	0.0063	30.7	
250	1.013	1.011	19	13.4	0.01382	0.0032	24.1	
1440	1.010	1.008	19	14.2	0.01382	0.0014	17.5	
4140	1.010	1.008	19	14.2	0.01382	0.0008	17.5	



U.S. STANDARD SIEVE OPENING IN INCHES

U.S. STANDARD SIEVE NUMBERS



—■— SS16

Sample #	Classification	% Gravel	% Sand	% Silt	% Clay*	% Moist.	LL	PL	ΡI	Project:	CA HSR FRE_BAK
SS16	(CL) Sandy Silty Clay	0	26.8	34.2	39.0						
										TES#:	23502-ZS9
										Boring#:	S0070R
										Date:	10/22/2013

^{*} Particles smaller than 5 Micron in diameter



Project Name:	HSR					Project No.: 23502-ZS9	
Soil Boring No:	S0070R	Depth:	0-0.5'	Date:	10/18/13	Tested By: K. Ford	
Sample No.:	B01					Classification: (ML) Sandy Silt	

No. of Blows

			PLASTIC LIMIT	
Α	Tes No.	1	2	3
В	Tare No.			
С	Mass of Pan + Dry Soil, g	23.23	30.78	32.61
D	Mass of Pan + Wet Soil, g	23.83	31.32	33.60
Ε	Mass of Pan, g	20.58	28.41	28.19
F	Mass of Water, g	0.60	0.54	0.99
G	Mass of Dry Soil, g	2.65	2.37	4.42
Н	Moisture Content, %	22.64	22.78	22.40
ı	Average Moisture Content, % (PL)	22.61	

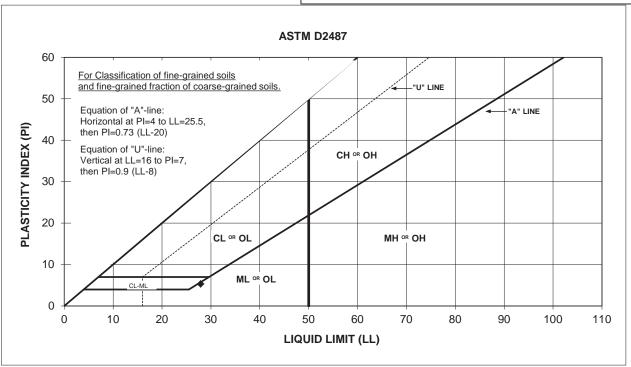
Liquid Limit:	27.9
Plastic Limit: Line I	22.6

5.3

Plasticity Index: Pl = LL - PL

LIQUID LIMIT							
15	20	27					
24.58	26.15	25.85					
25.68	27.68	27.24					
20.78	20.70	20.86					
1.10	1.53	1.39					
3.80	5.45	4.99					
28.95	28.07	27.86					

	y =	FLOW CUR\ -0.0871x + 30.09		
Moisture Content, %	70.00 65.00 60.00 55.00 45.00 40.00 35.00 30.00 25.00 20.00 15.00	25		100
		Number of B	Blows	





Project Name:	HSR					Project No.: 23502-ZS9
Soil Boring No:	S0070R	Depth:	46-46.5'	Date:	10/24/13	Tested By: K. Ford
Sample No.:	SS10				(Classification: (CL/ML) Sandy/Clayey Silt

No. of Blows

		PLASTIC LIMIT					
Α	Tes No.	1	2	3			
В	Tare No.						
С	Mass of Pan + Dry Soil, g	22.80	30.81	29.73			
D	Mass of Pan + Wet Soil, g	23.28	31.30	30.03			
Е	Mass of Pan, g	20.54	28.37	28.18			
F	Mass of Water, g	0.48	0.49	0.30			
G	Mass of Dry Soil, g	2.26	2.44	1.55			
Н	Moisture Content, %	21.24	20.08	19.35			
I	Average Moisture Content, % (20.23					

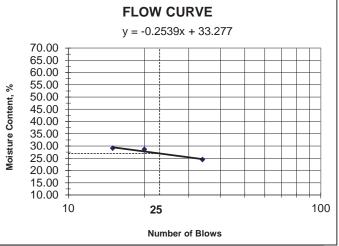
Liquid Limit:	26.9
Plastic Limit: Line I	20.2

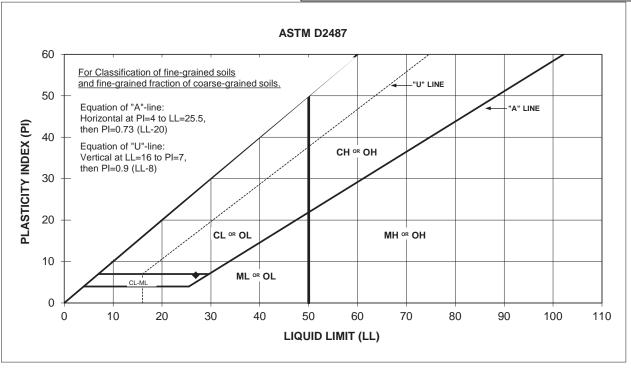
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Plasticity Index:

PI = LL - PL

LIQUID LIMIT							
34	20	15					
28.36	33.22	32.78					
30.16	34.53	33.98					
21.02	28.65	28.66					
1.80	1.31	1.20					
7.34	4.57	4.12					
24.52	28.67	29.13					







Project Name:	HSR					Project No.: 23502-ZS9	
Soil Boring No:	S0070R	Depth:	56-56.5'	Date:	10/29/13	Tested By: K. Ford	
Sample No.:	SS12				(Classification: (ML) Sandy Silt	

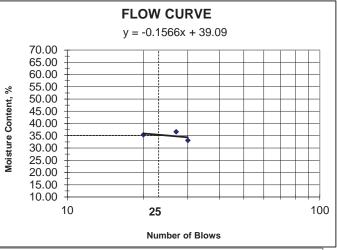
No. of Blows

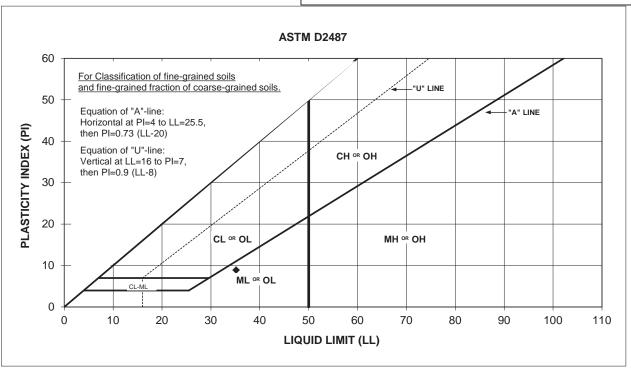
		PLASTIC LIMIT					
Α	Tes No.	1	2	3			
В	Tare No.						
С	Mass of Pan + Dry Soil, g	29.23	29.67	29.28			
D	Mass of Pan + Wet Soil, g	29.49	29.99	29.61			
Е	Mass of Pan, g	28.31	28.38	28.00			
F	Mass of Water, g	0.26	0.32	0.33			
G	Mass of Dry Soil, g	0.92	1.29	1.28			
Н	Moisture Content, %	28.26	24.81	25.78			
ı	Average Moisture Content, % (26.28					

1	Average	Moisture	Content,	%	(PL)	

Liquid Limit:	35.2
Plastic Limit: Line I	26.3
Plasticity Index: Pl = LL - PL	8.9

LIQUID LIMIT							
30	27	20					
22.37	29.49	23.25					
22.91	29.93	24.10					
20.74	28.29	20.85					
0.54	0.44	0.85					
1.63	1.20	2.40					
33.13	36.67	35.42					







Project Name:	HSR					Project No.: 23502-ZS9	
Soil Boring No:	S0070R	Depth:	96-96.5'	Date:	10/29/13	Tested By: K. Ford	
Sample No.:	SS21				(Classification: (ML) Sandy Silt	

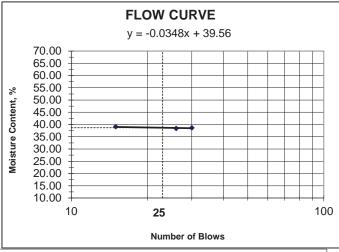
No. of Blows

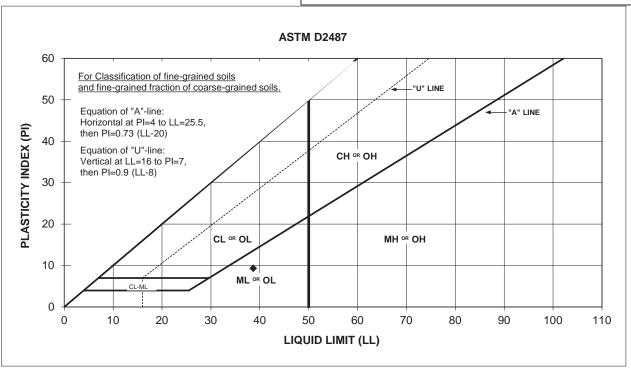
		PLASTIC LIMIT					
Α	Tes No.	1	2	3			
В	Tare No.						
С	Mass of Pan + Dry Soil, g	28.88	29.01	28.91			
D	Mass of Pan + Wet Soil, g	29.08	29.23	29.09			
Е	Mass of Pan, g	28.24	28.22	28.29			
F	Mass of Water, g	0.20	0.22	0.18			
G	Mass of Dry Soil, g	0.64	0.79	0.62			
Н	Moisture Content, %	31.25	27.85	29.03			
ı	Average Moisture Content, % (29.38					

Average Moisture Content, % (PL)	
----------------------------------	--

Liquid Limit:	38.7
Plastic Limit: Line I	29.4
Plasticity Index: Pl = LL - PL	9.3

LIQUID LIMIT				
30	26	15		
30.42	23.64	30.92		
31.24	24.77	31.96		
28.30	20.70	28.26		
0.82	1.13	1.04		
2.12	2.94	2.66		
38.68	38.44	39.10		







ASTM D2850

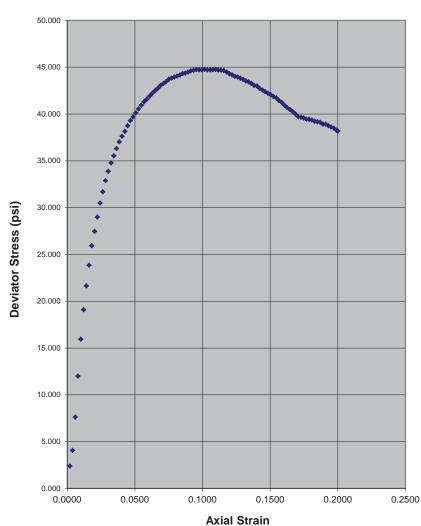
PROJECT	(CA HST	
BORING #	S0070R; MC2-2	Depth (ft)	6
DESCRIPT	ION ((CL) Sand Clay	

TES#	23502-ZS9
Test Date	12/2/2013
Tested By	D. Carruba

Sample and Test Parameters

Wt. Specimen Wet + Tare (gm)	714.3	Water Content %	27.5	Diameter, D ₀ , (in)	2.39
Wt. Specimen Dry + Tare (gm)	560.4	Wt. Tare (gm)	0	Area, A ₀ , (in ²)	4.49
Wt. Water (gm)	153.9	Unit Wt. Wet (pcf)	121.3	Height, H ₀ , (in)	5.00
Wt. Speciment Dry (gm)	560.4	Unit Wt. Dry (pcf)	95.2	Volume, V ₀ , (in ³)	22.43
Rate, in/min	0.05	Rate, %/min	1.00	Saturation, %*	96.3
Cell Pressure, psi	15	Strain, %	10.16%	Deviator Stress, psi	44.76

*S.G. assumed 2.70







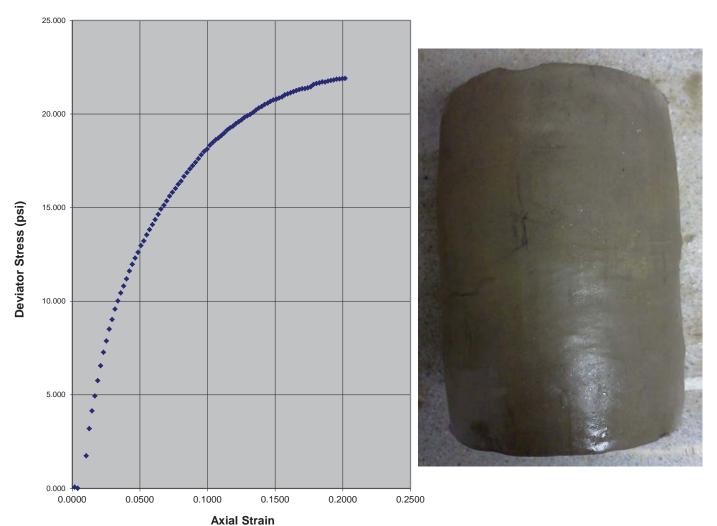
PROJECT	CA HST	
BORING #S0070R; I	MC-13-1 Depth (ft)	61
DESCRIPTION	CL	

TES#	23502-ZS9	
Test Date	11/7/2013	_
Tested By	D. Carruba	_

Sample and Test Parameters

Wt. Specimen Wet + Tare (gm)	733.7	Water Content %	25.0	Diameter, D ₀ , (in)	2.41
Wt. Specimen Dry + Tare (gm)	587.1	Wt. Tare (gm)	0	Area, A ₀ , (in ²)	4.56
Wt. Water (gm)	146.6	Unit Wt. Wet (pcf)	128.2	Height, H ₀ , (in)	4.78
Wt. Speciment Dry (gm)	587.1	Unit Wt. Dry (pcf)	102.6	Volume, V ₀ , (in ³)	21.80
Rate, in/min	0.05	Rate, %/min	1.00	Saturation, %*	104.9
Cell Pressure, psi	90	Strain, %	20.18%	Deviator Stress, psi	21.90

*S.G. assumed 2.70





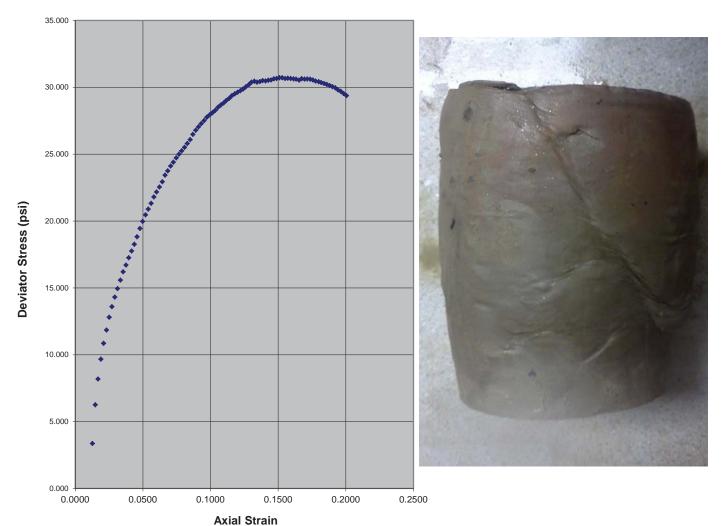
PROJECT	CA HST	
BORING # S0070R	; MC17-1 Depth (ft)	81
DESCRIPTION	CL	

TES#	23502-ZS9
Test Date	11/7/2013
Tested By	D. Carruba

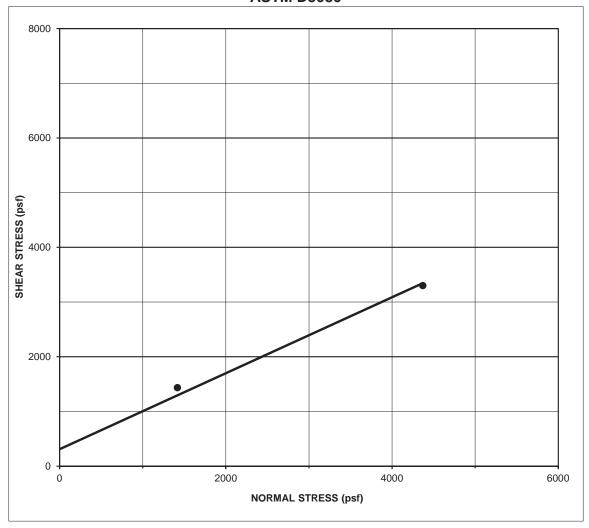
Sample and Test Parameters

Wt. Specimen Wet + Tare (gm)	737	Water Content %	29.5	Diameter, D ₀ , (in)	2.42
Wt. Specimen Dry + Tare (gm)	569.3	Wt. Tare (gm)	0	Area, A ₀ , (in ²)	4.60
Wt. Water (gm)	167.7	Unit Wt. Wet (pcf)	123.8	Height, H ₀ , (in)	4.93
Wt. Speciment Dry (gm)	569.3	Unit Wt. Dry (pcf)	95.6	Volume, V ₀ , (in ³)	22.68
Rate, in/min	0.05	Rate, %/min	1.00	Saturation, %*	104.4
Cell Pressure, psi	100	Strain, %	15.09%	Deviator Stress, psi	30.71

*S.G. assumed 2.70





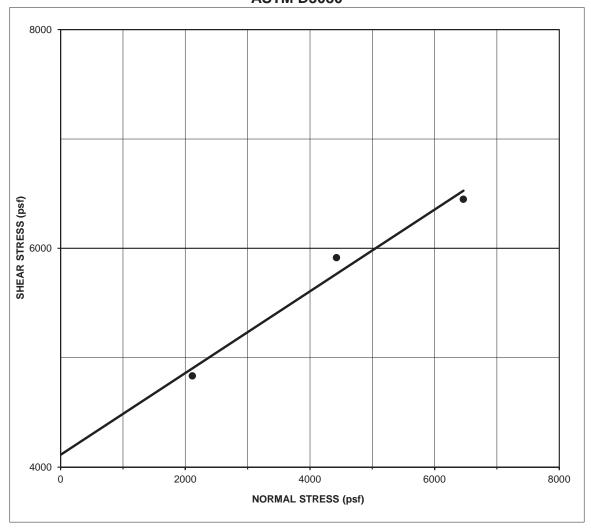


PROJECT:	HSR
TES NO.:	23502-ZS9
SAMPLE DATE.:	10/10/2013
BORING NO.:	S0070R
	U05 Depth(21-21.5')
DESCRIPTION:	Coarse Sand (SW)

Cohesive Pressure, psf	540
Internal Friction Angle	32

SPECIMEN	А	В	С	D	Е
DRY DENSITY (pcf)	83.2	83.2	Disturbed		
INITIAL WATER CONTENT (%)	12.2	12.2			
FINAL WATER CONTENT (%)	23.50	22.30			
NORMAL STRESS (psf)	1418	4371			
NORMAL STRESS (psi)	10	30			
MAXIMUM SHEAR (psf)	1434	3300			



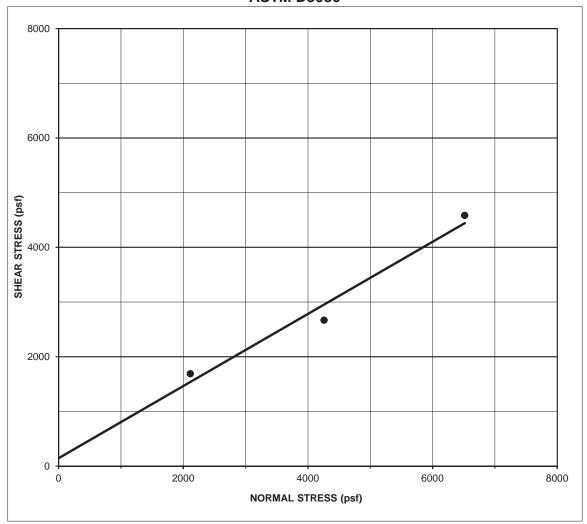


PROJECT:	HSR
TES NO.:	23502-ZS9
SAMPLE DATE.:	10/10/2013
BORING NO.:	S0070R
SAMPLE NO.:	MC07-1 Depth(31'-31.5')
DESCRIPTION:	Fine Sand (SP)

Cohesive Pressure, psf	4110
Internal Friction Angle	20

SPECIMEN	А	В	С	D	Е
DRY DENSITY (pcf)	109.5	109.5	109.5		
INITIAL WATER CONTENT (%)	11.9	11.9	11.9		
FINAL WATER CONTENT (%)	18.50	17.80	17.10		
NORMAL STRESS (psf)	2115	4426	6462		
NORMAL STRESS (psi)	15	30	45		
MAXIMUM SHEAR (psf)	4834	5914	6449		



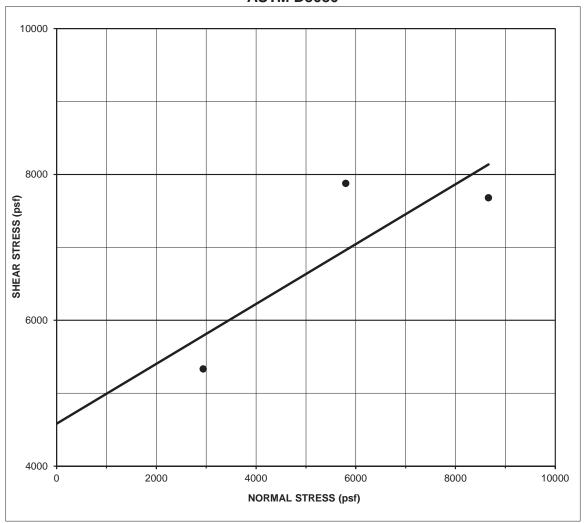


PROJECT:	HSR
TES NO.:	23502-ZS9
SAMPLE DATE.:	10/10/2013
BORING NO.:	S0070R
SAMPLE NO.:	MC09-1 Depth(41'-41.5')
DESCRIPTION:	Silty Sand (SM)

Cohesive Pressure, psf	140
Internal Friction Angle	33

SPECIMEN	А	В	С	D	Е
DRY DENSITY (pcf)	101.9	101.9	101.9		
INITIAL WATER CONTENT (%)	22.6	22.6	22.6		
FINAL WATER CONTENT (%)	24.10	22.20	18.80		
NORMAL STRESS (psf)	2115	4261	6517		
NORMAL STRESS (psi)	15	30	45		
MAXIMUM SHEAR (psf)	1687	2667	4583		





PROJECT:	HSR
TES NO.:	23502-ZS9
SAMPLE DATE.:	10/10/2013
BORING NO.:	S0070R
SAMPLE NO.:	MC11-1 Depth(51'-51.5')
DESCRIPTION:	Fine Sand (SP)

Cohesive Pressure, psf	4580
Internal Friction Angle	22

SPECIMEN	А	В	С	D	Е
DRY DENSITY (pcf)	104.3	104.3	104.3		
INITIAL WATER CONTENT (%)	18.7	18.7	18.7		
FINAL WATER CONTENT (%)	22.90	23.90	26.60		
NORMAL STRESS (psf)	2940	5801	8662		
NORMAL STRESS (psi)	20	40	60		
MAXIMUM SHEAR (psf)	5332	7877	7680		



R - VALUE TEST ASTM D - 2844 / CAL 301

Project Number : 23502-ZS9

Project Name : CA HSR FRE_BAK

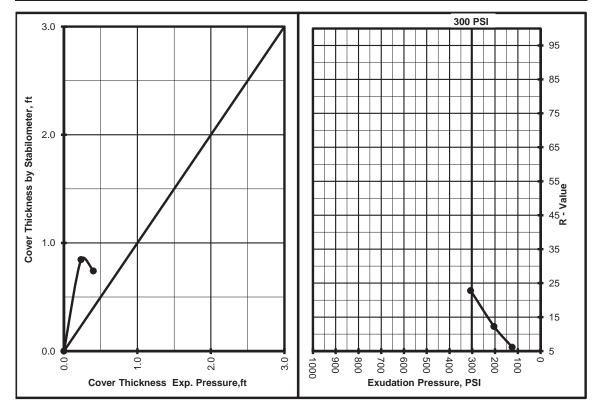
Date : 10/7/13

Sample Location/Curve Number : Boring S0070R,B-1 @ 0-5'

Soil Classification : SM - Untreated

TEST	А	В	С
Percent Moisture @ Compaction, %	16.6	15.5	14.7
Dry Density, lbm/cu.ft.	111.0	112.8	115.3
Exudation Pressure, psi	124	204	307
Expansion Pressure, (Dial Reading)	0	0.0007	0.0012
Expansion Pressure, psf	0	0.003031	0.005196
Resistance Value R	6	12	23

R Value at 300 PSI Exudation Pressure	(22)
R Value by Expansion Pressure (TI =): 5	38







R - VALUE TEST ASTM D - 2844 / CAL 301

Project Number : 23502-ZS9

Project Name : CA HSR FRE_BAK

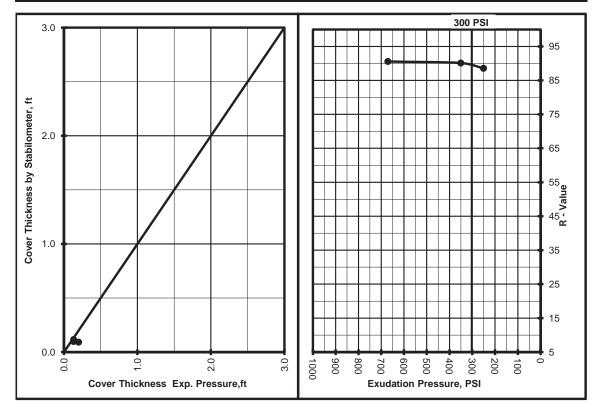
Date : 10/7/13

Sample Location/Curve Number : Boring S0070R,B-1 @ 0-5'

Soil Classification : CL- Treated w/ Quicklime Plus @ 4%

TEST	А	В	С
Percent Moisture @ Compaction, %	14.9	14.5	14.0
Dry Density, lbm/cu.ft.	111.8	111.0	112.5
Exudation Pressure, psi	250	350	670
Expansion Pressure, (Dial Reading)	0.0004	0.0004	0.0006
Expansion Pressure, psf	0.001732	0.001732	0.002598
Resistance Value R	89	90	91

R Value by Expansion Pressure (TI =): 5	(90)
R Value at 300 PSI Exudation Pressure	90







Project Number : 23502-ZS9

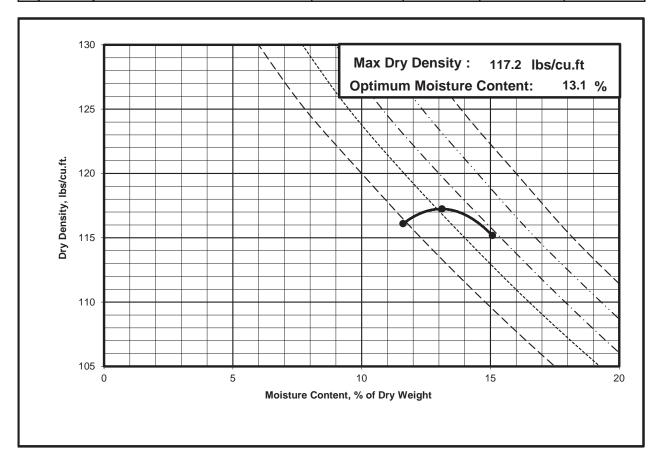
Project Name : CA HSR FRE_BAK

Date : 10/22/2013 Sample location : S0070R Sample/Curve Number : B01 0-5'

Soil Classification : (SM) Fine-Med Silty Sand

Test Method : 1557C

	1	2	3	4
Weight of Moist Specimen & Mold, gm	7369.2	7366.1	7265.2	
Weight of Compaction Mold, gm	2857.3	2857.3	2857.3	
Weight of Moist Specimen, gm	4511.9	4508.8	4407.9	
Volume of mold, cu. ft.	0.0750	0.0750	0.0750	
Wet Density, lbs/cu.ft.	132.6	132.5	129.6	
Weight of Wet (Moisture) Sample, gm	200.0	200.0	200.0	
Weight of Dry (Moisture)Sample, gm	176.8	173.8	179.2	
Moisture Content, %	13.1	15.1	11.6	
Dry Density, lbs/cu.ft.	117.2	115.2	116.1	





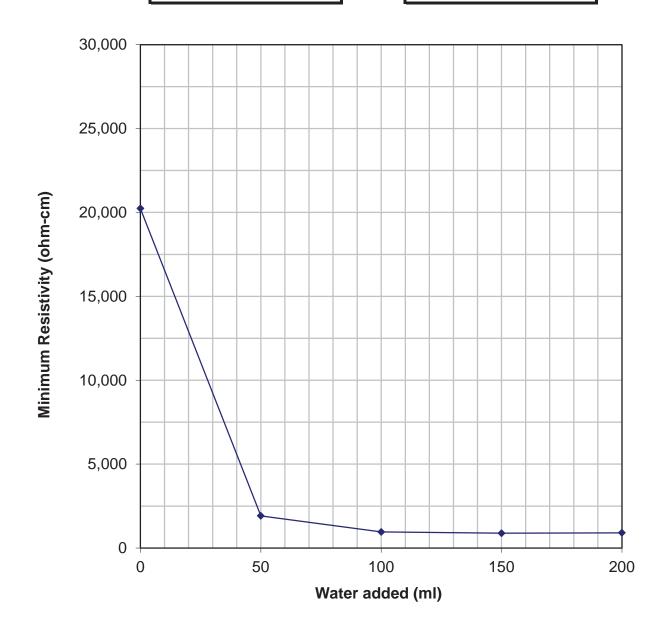
Project Name	CA HSR FRE_BAK	Sample Number	B01
Project Number	23502-ZS9	Sample Location	Boring S0070R
Sample Date	10/10/2013	Material Description	ML
Sampled By	M. Walker		

Sample Condition	As Received			Minimum	Resistivity	1	
Water Added (ml)	0	50	100	150	200		
Resistance (ohm)	19,000	1,800	900	830	850		
Resistivity (ohm-cm)	20,235	1,917	959	884	905		

Minimum Resistivity (ohm-cm)_884 Field Resistivity (ohm-cm)

> EC= PH=_6.40

Box Constant= 1.065



Chemical Analysis

SO₄- Modified Caltrans 417 & CL - Modified Caltrans 417/422

SEG Project Number

: 1-513-0002

TES Project Number

23502-ZS9

Date

10/21/13

Sample Location

B01

50070R

Soil Classification

C.

Soluble Sulfate SO ₄ -S		Soluble Chloride Cl	
50	mg/Kg	177	mg/Kg
50	mg/Kg	173	mg/Kg
50	mg/Kg	172	mg/Kg
50	mar/Kor	174	mg/Kg
	Sulfate SO ₄ -S 50 50	Sulfate SO ₄ -S 50 mg/Kg 50 mg/Kg 50 mg/Kg	Sulfate Chloride SO ₄ -S Cl 50 mg/Kg 177 50 mg/Kg 173 50 mg/Kg 172

